

COD INVESTIGATION

About thirty-five million pounds of cod are landed in the United States each year, with a total value of about two and one-quarter million dollars. These fish are taken with various gears, but mostly otter trawls. A considerable amount is taken by large otter trawlers based at Boston and engaged mainly in the haddock fishery. Besides being an important incidental catch for these vessels, the cod serves as a buffer in times of low haddock abundance.

There appears to be at the present time a marked increase in abundance of cod associated with a decrease in haddock. There is some indication that management of this fishery by the mesh regulation now in force is having beneficial effects in protecting the strong year classes entering the fishery.

The responsibility of the Woods Hole Biological Laboratory for cod research is broader, however, than local considerations imply. Because of its commitment to the International Commission for the Northwest Atlantic Fisheries (whose member nations take about two billion pounds of cod from the Convention Area each year), the United States is doing research in support of the Commission's program for maximum sustained yield from the Northwest Atlantic cod fishery. The Woods Hole Biological Laboratory is in a position to make unique contributions to cod biology, being situated as it is close to the fastest-growing and perhaps ;most widely fluctuating stocks of cod in the Atlantic. Studies of these stocks promise to yield much valuable information about the general biology and ecology of the species, which will be applicable to the whole ICNAF area.

August 6, 1959

SUMMARY C ROL SCHEDULE

Investigation: Cod
Biological Laboratory: Woods Hole, Mass.

| Project Title | Est.* Cost | Fiscal Years | | | | | | | | | |
|--|-------------------------|-------------------|--------------------------------------|------|-----------------------------|------|------|------|------|------|------|
| | | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 |
| 1. Bibliography | 29.0 | 8.0 | 8.0 | 8.0 | 5.0 | - | - | - | - | - | - |
| 2. Age and growth of Cod from Cape Sable to Hatteras | 14.6 | - | - | 2.3 | 3.3 | 4.0 | 5.0 | - | - | - | - |
| 3. Migrations of cod in the area from Cape Sable to Cape Hatteras | 58.5 | 8.0 | 9.5 | 8.0 | 5.0 | 5.0 | 5.0 | 9.0 | 9.0 | - | - |
| 4. Definition of cod stocks from Cape Sable to Cape Hatteras | 66.8 | 8.0 | 8.5 | 6.0 | 5.3 | 6.0 | 6.0 | 8.0 | 9.0 | 10.0 | - |
| 5. Biology of Middle Atlantic Cod | 66.7 | 8.0 | 9.1 | 6.0 | 4.3 | 6.0 | 6.0 | 8.0 | 9.0 | 10.0 | - |
| 6. Parasites of cod from Cape Sable to Cape Hatteras | 81.1 | 7.7 | 9.1 | 6.0 | 4.0 | 6.0 | 6.0 | 9.0 | 9.0 | 10.0 | 14.0 |
| 7. Chromatography studies of cod tissues | 61.0 | - | - | 6.0 | 4.0 | 4.0 | 5.0 | 9.0 | 9.0 | 10.0 | 14.0 |
| 8. Distribution of pre-recruit cod in the area fr. Cape Sable to Cape Hatteras | 55.2 | - | - | - | - | 5.7 | 7.1 | 9.2 | 9.2 | 10.0 | 14.0 |
| 9. Fluctuations in year class | 29.1 | - | - | - | - | - | - | - | 5.1 | 10.0 | 14.0 |
| 10. Seasonal changes in abundance | 23.8 | - | - | - | - | - | - | - | - | 8.8 | 15.0 |
| Investigation Total | 485.8 | 39.7 | 41.8 | 42.3 | 30.9 | 36.7 | 40.1 | 52.2 | 59.3 | 68.8 | 71.0 |
| Annual Review | | | | | | | | | | | |
| Laboratory | Regional or Area Office | Washington Office | Prepared by: John P. Wise | | Date | | | | | | |
| | | | Recommended by: | | Date | | | | | | |
| | | | Lab. Director Herbert W. Graham | | 8/6/59 | | | | | | |
| | | | Reg. or Area Dir. Joseph R. Thompson | | 8/6/59 | | | | | | |
| | | | Branch Chief | | DATE 12-24-59 | | | | | | |
| | | | Approved by: | | Division Chief for Director | | | | | | |

*Total needed by Laboratory for project in thousands of dollars.

check length projects.

#714 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Cod Bibliography Project

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | |
|-----------------|--|---------------------------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist,</u> | <u>GS-11</u> |
| | <u>Name</u> | <u>Title</u> <u>Grade</u> |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5

Collaborators:

Librarian, Marine Biological Laboratory, Woods Hole

Need for Information: There is a great deal of information in the scientific and technical literature of the world concerning the biology of the Atlantic cod, Gadus morhua L. Some of this is contained in the standard fishery journals, but a considerable body of data is scattered throughout other journals primarily concerned with embryology, biochemistry, etc. For the efficient prosecution of research on the cod it is necessary to seek out and to arrange this information in a systematic fashion.

Objective: To assemble an indexed bibliography to the literature of the cod.

Method of Procedure: Standard techniques of library search, including assessment of bibliographies contained in all available papers. Interlibrary loans where needed. Abstracting of all pertinent papers to punch cards, which are coded for author, date of publication, geographic area, and subjects.

Phase 2:

Method of Procedure: (Cont'd)

Phase 3:

| | | | |
|-------------------|---|----------------|----------------|
| Estimated Costs: | Total Needed by Laboratory for Complete Project <u>29.0</u> | | |
| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
| Personal Services | <u>1.2</u> | <u>1.8</u> | <u>--</u> |
| Other Expenses: | | | |
| Within Project | <u>.1</u> | <u>.1</u> | <u>--</u> |
| Lab. Adm. & Ser. | <u>6.7</u> | <u>3.1</u> | <u>--</u> |
| Lab. Total | <u>8.0</u> | <u>5.0</u> | <u>--</u> |
| Regional Office | <u>.08</u> | <u>.05</u> | |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY; Phase 2 FY; Phase 3 FY; Project FY 60

| | | |
|-----------------------------|--------------------------|-----------------|
| Recommended by: | | Date |
| Originator | <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief | <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director | <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director | <u>Joseph E. Pomeroy</u> | <u>8/19/59</u> |
| Branch Chief | <u>WHE.</u> | <u>12-24-59</u> |
| Approved by: | | |
| Division Chief for Director | <u>WHA</u> | <u>1-2-60</u> |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Age and Growth of Cod from Cape Sable to Cape Hatteras

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | |
|-----------------|--|--------------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist,</u> | <u>GS-11</u> |
| | <u>Name</u> | <u>Title</u> |
| | | <u>Grade</u> |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5

Vacant, Fishery Research Biologist, GS-7 (commencing FY 1961)

Vacant, Student Assistant, GS-4 (FY 1958 and others as assigned)

Collaborators:

None

Need for Information: One of the primary population parameters needed for assessment and management of a fishery is the growth rate, together with information about variations in this growth rate from year to year, from season to season, and from place to place.

Objective: To assess the growth rate of the cod in the area of study and to measure variations in this rate.

Method of Procedure: Collection of hard parts of the cod (scales, otoliths, bones, etc.) and evaluation of these as indicators of annual growth.

Phase 1: Comparison of annual rings in the parts chosen with the measured growth of the animal from which they came. Back-calculation of previous growth if indicated. Calculation of growth from measurements of tagged and recaptured fish.

Phase 2:

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 14.6

| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
|-------------------|----------------|----------------|----------------|
| Personal Services | <u>1.3</u> | <u>2.0</u> | <u>2.5</u> |
| Other Expenses: | | | |
| Within Project | <u>.1</u> | <u>.2</u> | <u>.3</u> |
| Lab. Adm. & Ser. | <u>.9</u> | <u>1.1</u> | <u>1.2</u> |
| Lab. Total | <u>2.3</u> | <u>3.3</u> | <u>4.0</u> |
| Regional Office | <u>.023</u> | <u>.033</u> | <u>.04</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 62

Recommended by:

| | Date |
|--|-----------------|
| Originator <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director <u>Joseph G. Pomeroy</u> | <u>8/19/59</u> |
| Branch Chief <u>WHE</u> | <u>12-24-59</u> |
| Approved by: | |
| Division Chief for Director <u>WHE</u> | <u>1-2-60</u> |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Migrations of cod in the area from Cape Sable to Cape Hatteras

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | |
|-----------------|--|--------------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist,</u> | <u>GS-11</u> |
| | Name | Title |
| | | Grade |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5

Vacant, Fishery Research Biologist, GS-7 (commencing FY 1961)

Collaborators:

None

Need for Information: The cod is known to be one of the more migratory of the demersal fishes of the area. Its migrations appear to be related to size, breeding condition, season of year, and other unknown factors. These migrations have strong effects on the identity of populations, availability to fishing gears, etc.

Objective: To assess and evaluate the migrations of cod in the area and to relate these movements where possible to the environment and biology of the fish.

Method of Procedure: Tagging of fish at strategically located areas. Collection and assessment of information about time and place of recapture.

Phase 1: Deductive reasoning from other information about morphometrics and meristics, abundance and distribution.

Phase 2:

God - 3

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 58.5

| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
|-------------------|----------------|----------------|----------------|
| Personal Services | <u>1.5</u> | <u>2.0</u> | <u>2.5</u> |
| Other Expenses: | | | |
| Within Project | <u>.3</u> | <u>.2</u> | <u>.3</u> |
| Lab. Adm. & Ser. | <u>6.2</u> | <u>2.8</u> | <u>2.2</u> |
| Lab. Total | <u>8.0</u> | <u>5.0</u> | <u>5.0</u> |
| Regional Office | <u>.08</u> | <u>.05</u> | <u>.05</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY; Phase 2 FY; Phase 3 FY; Project FY 64

| Recommended by: | Date |
|--|-----------------|
| Originator <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director <u>Joseph F. Penner</u> | <u>8/19/59</u> |
| Branch Chief <u>WHE.</u> | <u>12-24-59</u> |
| Approved by: Division Chief for Director <u>John P. Wise</u> | <u>1-2-60</u> |

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

7
Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Definition of cod stocks from Cape Sable to Cape Hatteras

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

Project Leader: John P. Wise, Fishery Research Biologist, GS-11
Name Title Grade

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5
Vacant, Fishery Research Biologist, GS-7 (commencing FY 1961)
Vacant, Student Assistant, GS-4 (FY 1957 and others as assigned)

Collaborators:

None

Need for Information: Assessment and management of a fished population requires that the stocks of fish comprising the population be identified in order that different growth rates, mortality rates, fecundities, etc., may be accounted for.

Objective: To determine the number of cod stocks in the area, their differential distribution and abundance, and the varying population parameters in the stocks.

Method of Procedure: Standard techniques of tagging in conjunction with migrations project. Collection of length-frequency data, morphometrics and meristics; application of techniques of chromatography and serology as appropriate. Assessment and rigorous statistical testing of these data to determine the different stocks and their intermixture if any.

Phase 2:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 66.8

| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
|-------------------|----------------|----------------|----------------|
| Personal Services | <u>1.8</u> | <u>3.0</u> | <u>2.0</u> |
| Other Expenses: | | | |
| Within Project | <u>.4</u> | <u>.4</u> | <u>.2</u> |
| Lab. Adm. & Ser. | <u>3.8</u> | <u>1.9</u> | <u>3.8</u> |
| Lab. Total | <u>6.0</u> | <u>5.3</u> | <u>6.0</u> |
| Regional Office | <u>.06</u> | <u>.053</u> | <u>.06</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY65

Recommended by:

| | Date |
|--|-----------------|
| Originator <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director <u>Joseph G. Pomeroy</u> | <u>8/19/59</u> |
| Branch Chief <u>Wise</u> | <u>12-24-59</u> |
| Approved by: <u>Wise</u> | <u>1-2-60</u> |
| Division Chief for Director | |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Biology of the Middle Atlantic Cod

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | |
|-----------------|--|--------------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist,</u> | <u>GS-11</u> |
| | Name | Title |
| | | Grade |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5

Vacant, Fishery Research Biologist, GS-7 (commencing FY 1961)

Collaborators:

None

Need for Information: The Middle Atlantic cod inhabit mainly the New York and New Jersey coasts in winter, and the Southern New England area in summer, spending most of the other two seasons of the year in the transition. While this stock is not in itself important to the fishery, it is of marked biological interest since it represents the southernmost indigenous stock of a species distributed to the Arctic. A study of the biology of this stock should lead to considerable increase in information about the life history and ecology of the species generally, since in such an area the ecological "edge effects" may be studied and measured.

Objective: To learn as much as possible about the biology of the Middle Atlantic cod, particularly as they are related to their environment.

Method of Procedure: Standard methods of fishery biology, supplemented by special studies of the environment and relations of the environment to the fish.

Phase 1:

Phase 2:

Cod - 5

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 66.7

| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
|-------------------|----------------|----------------|----------------|
| Personal Services | <u>1.5</u> | <u>1.0</u> | <u>2.0</u> |
| Other Expenses: | | | |
| Within Project | <u>.2</u> | <u>.2</u> | <u>.2</u> |
| Lab. Adm. & Ser. | <u>4.3</u> | <u>3.1</u> | <u>3.8</u> |
| Lab. Total | <u>6.0</u> | <u>4.3</u> | <u>6.0</u> |
| Regional Office | <u>.06</u> | <u>.043</u> | <u>.06</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY; Phase 2 FY; Phase 3 FY; Project FY 66

Recommended by:

| | | |
|-----------------------------|---|--------------------|
| Originator | <u>John P. Wise</u> | Date <u>8/6/59</u> |
| Investigation Chief | <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director | <u>Herbert M. Graham</u> | <u>8/6/59</u> |
| Regional Director | | <u>8/19/59</u> |
| Branch Chief | <u>Project should be re-examined & restricted</u> | |
| Approved by: | <u>in scope. HWE. 12-24-59.</u> | |
| Division Chief for Director | | |

Remarks

(Continue on reverse side)

#715 7/9/59

Sheet No. 1

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Parasites of cod from Cape Sable to Cape Hatteras

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | |
|-----------------|--|--------------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist,</u> | <u>GS-11</u> |
| | Name | Title |
| | | Grade |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5

Vacant, Student Assistant, GS-4 (FY 1958 and others as assigned)

Collaborators:

None

Need for Information: The parasites of cod are useful in furnishing information about the identity of stocks, particularly since previous investigation of one of these parasites in some detail has shown that the incidence of its occurrence is closely related to the different stocks of fish. In addition, there are some technological problems connected with cod parasites, particularly since some of the parasites render the fillets unmarketable, or at least less desirable commercially.

Objective: To assess the numbers and kinds of parasites to be found in and on cod in the area, and to relate this information where possible to the life history and biology of the fish.

Method of Procedure: A general parasite inventory, with special studies of various specific parasites when these are indicated, using standard techniques of examination of market samples and specially collected samples.

Phase 1:

Phase 2:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 81.1

| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
|-------------------|----------------|----------------|----------------|
| Personal Services | <u>1.2</u> | <u>1.0</u> | <u>2.0</u> |
| Other Expenses: | | | |
| Within Project | <u>.1</u> | <u>.1</u> | <u>.1</u> |
| Lab. Adm. & Ser. | <u>4.7</u> | <u>2.9</u> | <u>2.9</u> |
| Lab. Total | <u>6.0</u> | <u>4.0</u> | <u>6.0</u> |
| Regional Office | <u>.06</u> | <u>.04</u> | <u>.06</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY

Recommended by:

| | | Date |
|-----------------------------|--------------------------|-----------------|
| Originator | <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief | <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director | <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director | <u>Joseph P. Dineen</u> | <u>8/19/59</u> |
| Branch Chief | <u>NHE</u> | <u>12-24-59</u> |
| Approved by: | <u>[Signature]</u> | <u>1-2-60</u> |
| Division Chief for Director | | |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Chromatography Studies of Cod Tissues

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | | | |
|-----------------|--|-------|-------|-------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist, GS-11</u> | | | |
| | <table border="0"><tr><td style="text-align: center;">Name</td><td style="text-align: center;">Title</td><td style="text-align: center;">Grade</td></tr></table> | Name | Title | Grade |
| Name | Title | Grade | | |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5

Collaborators:

University Biochemistry Department and/or BCF chemists.

Need for Information: Preliminary explorations of techniques, primarily by European and West Coast workers, have shown that paper chromatography, principally of muscle tissue, can be used to identify groups of fishes. Some difficulties have been encountered, particularly with regard to state of preservation of the muscle tissues and with regard to seasonal variation in the metabolism of the subject. This technique would be particularly useful in the study of cod populations and would, if pursued far enough, yield information on the metabolism and biology of the cod itself.

Objective: To work out dependable techniques for the use of chromatographic methods in analysis of cod tissues so that stocks of fish can be identified and so that metabolic studies on individual fish can be conducted.

Method of Procedure: Experimentation in conjunction with chemically trained personnel to develop appropriate chromatographic methods and to

Phase 1: eliminate variables caused by state of preservation of fish and metabolic condition.

Phase 2:

Method of Procedure: (Cont'd)

Phase 3:

| | | | |
|-------------------|---|----------------|----------------|
| Estimated Costs: | Total Needed by Laboratory for Complete Project <u>61.0</u> | | |
| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
| Personal Services | <u>1.3</u> | <u>1.0</u> | <u>2.0</u> |
| Other Expenses: | | | |
| Within Project | <u>.1</u> | <u>.1</u> | <u>.2</u> |
| Lab. Adm. & Ser. | <u>4.6</u> | <u>2.9</u> | <u>1.8</u> |
| Lab. Total | <u>6.0</u> | <u>4.0</u> | <u>4.0</u> |
| Regional Office | <u>.06</u> | <u>.04</u> | <u>.04</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY; Phase 2 FY; Phase 3 FY; Project FY

| | | |
|-----------------------------|--------------------------|-----------------|
| Recommended by: | | Date |
| Originator | <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief | <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director | <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director | <u>Joseph G. Pinner</u> | <u>8/19/59</u> |
| Branch Chief | <u>2/NE</u> | <u>12-24-59</u> |
| Approved by: | | |
| Division Chief for Director | <u>[Signature]</u> | <u>1-2-60</u> |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Distribution of prerecruit cod in the area from Cape Sable to Cape Hatteras

Investigation Title: Cod Investigation

Investigation Chief: John P. Wise

| | | |
|-----------------|--|--------------|
| Project Leader: | <u>John P. Wise, Fishery Research Biologist,</u> | <u>GS-11</u> |
| | <u>None</u> | <u>Title</u> |
| | | <u>Grade</u> |

Assistants: (Title and Grade)

H. E. Murray, Statistical Clerk, GS-5
Vacant, Fishery Research Biologist, GS-7
Vacant, Student Assistant, GS-4 (as assigned)

Collaborators:

None

Need for Information: Information is lacking about the distribution of cod from the time they leave the plankton shortly after hatching until they enter the fishery as recruits. This is probably a vitally important period in their life history, possibly the one in which the strength of each successive yearclass is determined. Some assessment of the relative numbers of juvenile fish during this stage would be extremely useful in prediction of the strength of the yearclass to enter the fishery a year or two later.

Objective: To locate the areas and ecological niches inhabited by the cod before they enter the fishery and to attempt to develop methods of quantitative estimates of numbers.

Method of Procedure:

Phase 1: A search, using mostly small chartered vessels, in areas likely to be occupied by juvenile cod, particularly along the rocky shores north of Boston.

Phase 2: Development of methods of quantitative sampling of these fish.

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 55.2

| | FY <u>1959</u> | FY <u>1960</u> | FY <u>1961</u> |
|-------------------|----------------|----------------|----------------|
| Personal Services | | | <u>4.0</u> |
| Other Expenses: | | | |
| Within Project | | | <u>1.0</u> |
| Lab. Adm. & Ser. | | | <u>.7</u> |
| Lab. Total | | | <u>5.7</u> |
| Regional Office | | | <u>.057</u> |
| Washington Office | | | |
| Total | | | |

Recommended Source of Funds S--K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 61; Phase 2 FY; Phase 3 FY; Project FY

Recommended by:

| | | <u>Date</u> |
|-----------------------------|--------------------------|-----------------|
| Originator | <u>John P. Wise</u> | <u>8/6/59</u> |
| Investigation Chief | <u>John P. Wise</u> | <u>8/6/59</u> |
| Laboratory Director | <u>Herbert W. Graham</u> | <u>8/6/59</u> |
| Regional Director | <u>Joseph L. Penner</u> | <u>8/19/59</u> |
| Branch Chief | <u>WHE</u> | <u>12-24-59</u> |
| Approved by: | | |
| Division Chief for Director | <u>[Signature]</u> | <u>1-2-60</u> |

Remarks

(Continue on reverse side)